

IN THE CLAIMS:

Please amend the claims as shown below, in which deleted terms are shown with strikethrough and/or double brackets, and added terms are shown with underscoring. This listing of the claims will replace all prior versions, and listings, of claims in the application.

1. (Previously presented) A casting die made of a steel material, wherein a compressive residual stress of a cavity surface is larger than 1200 MPa, a maximum height of roughness of the cavity surface is not more than 8 μm , and a nitrided layer is provided at a surface layer of said cavity surface,

wherein the nitrided layer is a compound diffusion layer containing both iron sulfide and iron nitride.

2. (Previously presented) The casting die according to claim 1, wherein a Vickers hardness of said cavity surface is not less than 700, a thickness of said nitrided layer is not less than 0.03 mm, and said steel material is alloy tool steel.

3. (Previously presented) The casting die according to claim 1, wherein a Vickers hardness of said cavity surface is not less than 700, a thickness of said nitrided layer is not less than 0.1 mm, and said steel material is chrome molybdenum steel.

4-5. (Canceled).

6. (Currently amended) A surface treatment method of a casting die made of a steel material, comprising applying a first shot peening treatment, applying a sulphonitriding treatment after

applying said shot peening treatment, and applying a second shot peening treatment after applying said sulphonitriding treatment to at least a cavity surface of said casting die so that a maximum height of roughness of said cavity surface is not more than 8 μm , and a compressive residual stress is larger than 1200 MPa, wherein each of said shot peening treatments is performed for a time period ranging from 5 seconds to 10 seconds.

7-9. (Canceled).

10. (Previously presented) The surface treatment method of said casting die according to claim 6, wherein said surface treatment method is applied to said casting die after the die has been used for casting operation.

11-13. (Canceled).

14. (Previously presented) The surface treatment method of said casting die according to claim 6, wherein hydrogen gas is applied to said cavity surface during said nitriding treatment.

15. (Canceled).

16. (Previously presented) The surface treatment method of said casting die according to claim 6, wherein ammonia gas, hydrogen sulfide gas, and hydrogen gas are applied to said cavity surface during said nitriding treatment to form a compound diffusion layer containing both iron sulfide and iron nitride.

17. (Previously presented) A steel die for use in casting metal workpieces, the die having a cavity surface formed therein and being a product of a process comprising the steps of:

a) performing a coarse peening step;

b) after the coarse peening step, applying a gaseous mixture comprising a sulfurizing gas and a nitriding gas to the cavity surface of the die in a processing chamber under controlled temperature conditions to form a sulphonitrided diffusion layer thereon; and

c) subsequently, performing a finishing peening step;

wherein a residual stress of the cavity surface is larger than 1200 MPa, and a maximum height of roughness of the cavity surface is not more than 8 μm .

18. (Previously presented) The steel die of claim 17, wherein the coarse peening step comprises applying water-borne ceramic particles to the cavity surface of the die, the ceramic particles having particle diameters between 200 and 220 mesh, and wherein the finishing peening step comprises applying water-borne glass particles to the cavity surface of the die, the glass particles having particle diameters between 200 and 220 mesh.

19. (Previously presented) The steel die of claim 17, wherein the temperature in the processing chamber is maintained in a range between 505 degrees Celsius and 580 degrees Celsius during the gaseous mixture application step.

20. (Previously presented) The steel die of claim 17, wherein the gaseous mixture comprises ammonia gas, hydrogen sulfide gas, and hydrogen gas.

21. (Previously presented) The surface treatment method of said casting die according to claim 6, wherein said first shot peening step involves discharge of water containing ceramic particles of 200-220 mesh at a pump discharge pressure of 0.39-0.59 MPa such that the ceramic particles collide against the cavity surface for 5-10 seconds/5 cm², and said second shot peening step involves discharge of water containing glass particles of 200-220 mesh at a pump discharge pressure of 0.29-0.49 MPa such that the ceramic particles collide against the cavity surface for 5-10 seconds/5 cm².

22. (Previously presented) The steel die of claim 17, wherein said coarse peening step involves discharge of water containing ceramic particles of 200-220 mesh at a pump discharge pressure of 0.39-0.59 MPa such that the ceramic particles collide against the cavity surface for 5-10 seconds/5 cm², and said finishing peening step involves discharge of water containing glass particles of 200-220 mesh at a pump discharge pressure of 0.29-0.49 MPa such that the ceramic particles collide against the cavity surface for 5-10 seconds/5 cm².